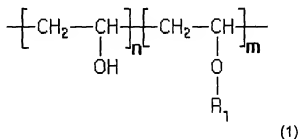


CLAIMS

What is claimed is:

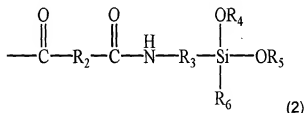
1. A water-soluble, antimicrobial active polymer represented by Formula 1:



wherein:

n and m are the number of repeated units, n is 0.7-0.95 and m is 0.05-0.3 provided that n+m=1; and

R₁ is a silane derivative represented by Formula 2:



wherein:

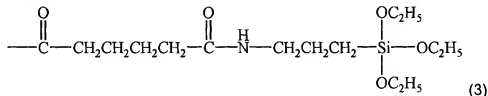
R₂ is selected from the group consisting of an alkylene of 1-30 carbon atoms, a heteroalkylene of 1-30 carbon atoms, an arylene of 6-20 carbon atoms, an arylalkylene of 6-20 carbon atoms, a heteroarylene of 6-30 carbon atoms, and a heteroarylalkylene of 6-30 carbon atoms, each of which is unsubstituted or substituted with a halogen, a hydroxyl, a nitro, a cyano, an amino, an amidino, a hydrazine, a hydrazone, carboxylic acid or a salt thereof, sulfonic acid or a salt thereof, phosphoric acid or a salt thereof, an alkyl of 1-20 carbon atoms, an alkenyl, an alkynyl, a heteroalkyl of 2-20 carbon atoms, an aryl of 6-20 carbon atoms, an arylalkyl of 6-30 carbon atoms, a heteroaryl of 6-30 carbon atoms, or a heteroarylalkyl of 6-30 carbon atoms;

R₃ is selected from the group consisting of an alkylene of 1-12 carbon atoms, an alkenylene or an alkynylene of 1-12 carbon atom, and a heteroalkylene of 1-12 carbon atoms, each of which is unsubstituted or substituted with a halogen, a hydroxyl, a nitro, a cyano, an amino, an amidino, a hydrazine, a hydrazone, carboxylic acid or a salt thereof, sulfonic acid or a salt thereof, phosphoric acid or a salt thereof, an alkyl of 1-20 carbon atoms, an alkenyl, an alkynyl, a heteroalkyl of 2-20 carbon atoms, an aryl of 6-20 carbon atoms, an arylalkyl of 6-30 carbon atoms, a heteroaryl of 6-30 carbon atoms, or a heteroarylalkyl of 6-30 carbon atoms;

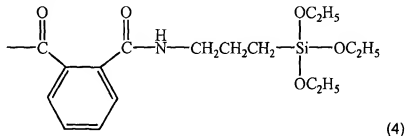
R₄ and R₅ are independently one of hydrogen, and an alkyl of 1-5 carbon atoms; and

R₆ is one of a hydrogen, a hydroxyl, and an alkoxyl of 1-5 carbon atoms.

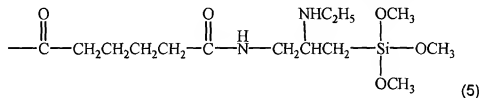
2. The water-soluble, antimicrobial active polymer according to claim 1, wherein the silane derivative of the Formula 2 is a compound represented by Formula 3:



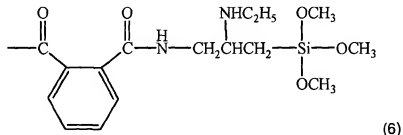
3. The water-soluble, antimicrobial active polymer according to claim 1, wherein the silane derivative of the Formula 2 is a compound represented by Formula 4:



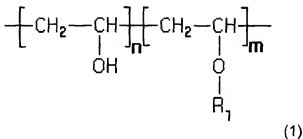
4. The water-soluble, antimicrobial active polymer according to claim 1, wherein the silane derivative of the Formula 2 is a compound represented by Formula 5:



5. The water-soluble, antimicrobial active polymer according to claim 1, wherein the silane derivative of the Formula 2 is a compound represented by Formula 6:



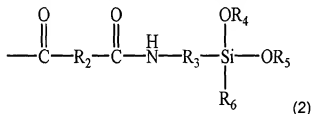
6. An ink composition comprising:
a water-soluble, antimicrobial active polymer represented by Formula 1:



wherein:

n and m are the number of repeated units, n is 0.7-0.95 and m is 0.05-0.3 provided that n+m=1; and

R₁ is a silane derivative represented by Formula 2:



wherein:

R₂ is selected from the group consisting of an alkylene of 1-30 carbon atoms, a heteroalkylene of 1-30 carbon atoms, an arylene of 6-20 carbon atoms, an arylalkylene of 6-20 carbon atoms, a heteroarylene of 6-30 carbon atoms, and a heteroarylalkylene of 6-30 carbon atoms, each of which is unsubstituted or substituted with a halogen, a hydroxyl, a nitro, a cyano, an amino, an amidino, a hydrazine, a hydrazone, carboxylic acid or a salt thereof, sulfonic acid or a salt thereof, phosphoric acid or a salt thereof, an alkyl of 1-20 carbon atoms, an alkenyl, an alkynyl, a heteroalkyl of 2-20 carbon atoms, an aryl of 6-20 carbon atoms, an arylalkyl of 6-30 carbon atoms, a heteroaryl of 6-30 carbon atoms, or a heteroarylalkyl of 6-30 carbon atoms;

R₃ is selected from the group consisting of an alkylene of 1-12 carbon atoms, an alkenylene or an alkynylene of 1-12 carbon atom, and a heteroalkylene of 1-12 carbon atoms, each of which is unsubstituted or substituted with a halogen, a hydroxyl, a nitro, a cyano, an amino, an amidino, a hydrazine, a hydrazone, carboxylic acid or a salt thereof, sulfonic acid or a salt thereof, phosphoric acid or a salt thereof, an alkyl of 1-20 carbon atoms, an alkenyl, an alkynyl, a heteroalkyl of 2-20 carbon atoms, an aryl of 6-20 carbon atoms, an arylalkyl of 6-30 carbon atoms, a heteroaryl of 6-30 carbon atoms, or a heteroarylalkyl of 6-30 carbon atoms;

R₄ and R₅ are independently one of hydrogen, and an alkyl of 1-5 carbon atoms; and

R₆ is one of a hydrogen, a hydroxyl, and an alkoxyl of 1-5 carbon atoms;

a colorant; and

an aqueous medium.

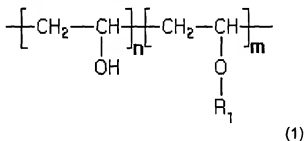
7. The ink composition according to claim 6, wherein the water-soluble, antimicrobial active polymer is added to the ink composition in an amount of 1 to 10 parts by weight based on 100 parts by weight of the ink composition.

8. The ink composition according to claim 6, wherein the aqueous medium is one of water alone and water in combination with at least one organic solvent.

9. The ink composition according to claim 8, wherein the organic solvent comprises a non-polyhydric alcohol, a ketone, ; an ester, a polyhydric alcohol, a lower alkyl ether, a nitrogen-containing compound, and a sulfur-containing compound.

10. The ink composition according to claim 6, further comprising a viscosity modifier, a surfactant, a storage stabilizer and a wetting agent.

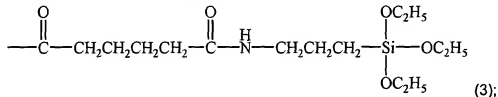
11. An ink composition comprising:
a water-soluble, antimicrobial active polymer represented by Formula 1:



wherein:

n and m are the number of repeated units, n is 0.7-0.95 and m is 0.05-0.3 provided that $n+m=1$; and

R₁ is a silane derivative represented by Formula 3:

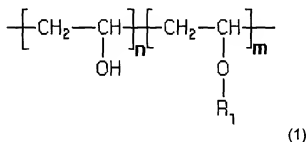


a colorant; and

an aqueous medium.

12. An ink composition comprising:

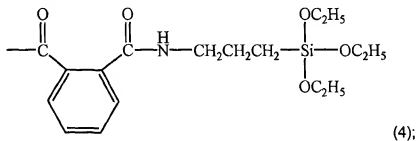
a water-soluble, antimicrobial active polymer represented by Formula 1:



wherein:

n and m are the number of repeated units, n is 0.7-0.95 and m is 0.05-0.3 provided that $n+m=1$; and

R₁ is a silane derivative represented by Formula 4:

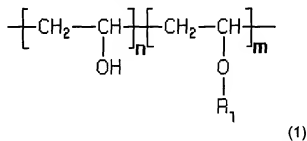


a colorant; and

an aqueous medium.

13. An ink composition comprising:

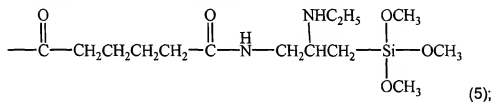
a water-soluble, antimicrobial active polymer represented by Formula 1:



wherein:

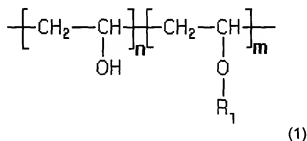
n and m are the number of repeated units, n is 0.7-0.95 and m is 0.05-0.3 provided that $n+m=1$; and

R₁ is a silane derivative represented by Formula 3:



a colorant; and
an aqueous medium.

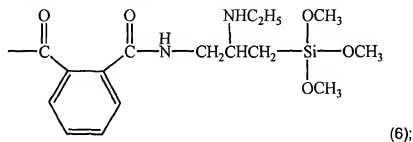
14. An ink composition comprising:
a water-soluble, antimicrobial active polymer represented by Formula 1:



wherein:

n and m are the number of repeated units, n is 0.7-0.95 and m is 0.05-0.3 provided that n+m=1; and

R₁ is a silane derivative represented by Formula 6:



a colorant; and
an aqueous medium.

15. The ink composition according to claim 9, wherein the non- polyhydric alcohol is at least one alcohol selected from the group consisting of methyl alcohol, ethyl alcohol, n-propyl alcohol, isopropyl alcohol, n-butyl alcohol, sec-butyl alcohol, t-butyl alcohol, and isobutyl alcohol.

16. The ink composition according to claim 9, wherein the ketone is at least one ketone selected from the group consisting of acetone, methylethyl ketone, and diacetone alcohol.

17. The ink composition according to claim 9, wherein the ester is at least one ester selected from the group consisting of ethyl acetate and ethyl lactate.

18. The ink composition according to claim 9, wherein the polyhydric alcohol is at least one polyhedric alcohol selected from the group consisting of ethyleneglycol, diethyleneglycol, triethyleneglycol, propyleneglycol, butyleneglycol, 1,4-butanediol, 1,2,4-butanetriol, 1,5-pentenediol, 1,2,6-hexanetriol, hexyleneglycol, glycerol, glycerol ethoxylate, and trimethylolpropane ethoxylate.

19. The ink composition according to claim 9, wherein the lower alkyl ether is at least one lower alkyl ether selected from the group consisting of ethyleneglycol monomethyl ether, ethyleneglycol monoethyl ether, diethyleneglycol methyl ether, diethyleneglycol ethyl ether, triethyleneglycol monomethyl ether, and triethyleneglycol monoethyl ether.

20. The ink composition according to claim 9, wherein the nitrogen-containing compound is at least one nitrogen-containing compound selected from the group consisting of 2-pyrrolidone and N-methyl-2-pyrrolidon.

21. The ink composition according to claim 9, wherein the sulfur-containing compound is at least one sulfur-containing compound selected from the group consisting of dimethyl sulfoxide, tetramethylenesulfone and thioglycol.